

General

Guideline Title

Mild traumatic brain injury.

Bibliographic Source(s)

Vos PE, Alekseenko Y, Battistin L, Ehler E, Gerstenbrand F, Muresanu DF, Potapov A, Stepan CA, Traubner P, Vecsei L, von Wild K, European Federation of Neurological Societies. Mild traumatic brain injury. Eur J Neurol. 2012 Feb;19(2):191-8. [34 references] [PubMed](#)

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

The levels of evidence (class I-IV) supporting the recommendations and ratings of recommendations (A-C, GPP) are defined at the end of the "Major Recommendations" field.

Clinical Decision Rules for Computed Tomography (CT)

Adults

- Protocols for initial management in mild traumatic brain injury (MTBI) should include a decision scheme or prediction rule algorithm for the use of CT after MTBI (Grade A).

Children

- In young patients with MTBI and a normal consciousness, prediction rules originally developed for adults may apply when they are 5 years of age or older (Grade C).
- In patients under 5 years of age, prediction rules for the need of CT to detect intracranial haematoma also apply but with a different set of risk factors, such as those applied in the Chalice study or the North American prospective cohort study (Grade A).
- In young patients under 5 years of age, CT is a gold standard for the detection of life-threatening (and other intracranial) abnormalities after MTBI (Grade B).
- In children under 2 years of age, a CT is not indicated if normal mental status, no scalp haematoma except frontal, no loss of consciousness (LOC) or LOC for <5 seconds, non-severe injury mechanism, no palpable skull fracture, and acting normally according to the parents (Grade A).
- In children aged 2 years and older, a CT is not indicated if all apply: a normal mental status, no LOC, no vomiting, non-severe injury mechanism, no signs of basilar skull fracture, and no severe headache (Grade A).

Initial Patient Management

- Following acute traumatic brain injury (TBI) all patients should undergo urgent neurological examination, in addition to a surgical examination (preferably according to Advanced Trauma Life Support [ATLS] or Advanced Pediatric Life Support [APLS] guidelines). Furthermore, accurate history taking (including medication), preferably with information being obtained from a witness of the accident or personnel involved in first-aid procedures outside the hospital, is important to ascertain the circumstances (mechanism of injury) under which the accident took place and to assess the duration of LOC and amnesia (GPP).

Home Discharge

- Patients with MTBI and a normal neurological examination (including a Glasgow Coma Scale [GCS] = 15), no risk factors (in particular a normal coagulation status, no drug or alcohol intoxication, no other injuries, no suspected non-accidental injury, no cerebrospinal fluid leak) and a normal CT could be observed at home and the patient is admitted only if some extracerebral cause occurred. (Grade A).
- For children under 6 years of age who are discharged home from the emergency department (ED), head injury warning instructions are recommended because of the likelihood of delayed cerebral swelling (GPP).
- Patients with a new and clinically significant traumatic lesion on CT, GCS <15, focal neurological deficit, restlessness or agitation, intoxication with alcohol or drugs, or other extracranial injuries should be admitted to the hospital (Grade C).
- A repeat CT should be considered if the admission CT findings were abnormal or if risk factors are present (Grade C).

Clinical Observation

- A complete neurological examination is mandatory after admission and should include assessment of the GCS, pupillary size and reaction to light, and short-term memory. Repeat neurological examination should be carried out, its frequency being dependent on the clinical condition of the patient; if the GCS is <15 it should be every 30 min. Patients with a GCS of 15 should be examined every 30 min, for 2 h, and if no complications or deterioration occurs, every hour for 4 h, thereafter once every 2 h. The use of a neurological checklist may be helpful to document the neurological condition and its course. If deterioration occurs, possible intracranial causes should be evaluated with (repeated) CT (Grade C).
- In-hospital observation of patients with a head injury should only be conducted by professionals competent in the assessment of head injury (GPP).

Follow-up

- It is recommended that all patients with MTBI who have been admitted to hospital should be seen at least once in the outpatient clinic in the first 2 weeks after discharge (Grade C). Patients who are discharged immediately should contact their general practitioners, who can decide to refer the patient to the neurologist if complaints persist (Grade C).

Definitions:

Evidence Classification Scheme for a Diagnostic Measure

Class I: A prospective study in a broad spectrum of persons with the suspected condition, using a 'gold standard' for case definition, where the test is applied in a blinded evaluation, and enabling the assessment of appropriate tests of diagnostic accuracy.

Class II: A prospective study of a narrow spectrum of persons with the suspected condition, or a well-designed retrospective study of a broad spectrum of persons with an established condition (by 'gold standard') compared to a broad spectrum of controls, where test is applied in a blinded evaluation, and enabling the assessment of appropriate tests of diagnostic accuracy.

Class III: Evidence provided by a retrospective study where either persons with the established condition or controls are of a narrow spectrum, and where test is applied in a blinded evaluation.

Class IV: Any design where test is not applied in blinded evaluation OR evidence provided by expert opinion alone or in descriptive case series (without controls).

Rating of Recommendations for a Diagnostic Measure

Level A rating (established as useful/predictive or not useful/predictive) requires at least one convincing class I study or at least two consistent, convincing class II studies.

Level B rating (established as probably useful/predictive or not useful/predictive) requires at least one convincing class II study or overwhelming class III evidence.

Level C rating (established as possibly useful/predictive or not useful/predictive) requires at least two convincing class III studies.

Good Practice Point (GPP) Where there was a lack of evidence but consensus was clear the Task Force has stated its opinion as Good Practice Points.

Clinical Algorithm(s)

The original guideline document contains a decision scheme for initial management in mild traumatic brain injury (modified from the Dutch and Scandinavian guidelines).

Scope

Disease/Condition(s)

Mild traumatic brain injury

Guideline Category

Diagnosis

Evaluation

Management

Risk Assessment

Clinical Specialty

Emergency Medicine

Family Practice

Internal Medicine

Neurological Surgery

Neurology

Orthopedic Surgery

Pediatrics

Radiology

Surgery

Intended Users

Hospitals

Physician Assistants

Physicians

Utilization Management

Guideline Objective(s)

To update guidelines for early management in mild traumatic brain injury with respect to the indication for computed tomography and early management (admission, clinical observation, and follow-up)

Target Population

Adults and children, including infants, who have or who are suspected of having mild traumatic brain injury

Interventions and Practices Considered

1. Establishment of a decision scheme or prediction rule algorithm for the use of computed tomography (CT) in cases of mild traumatic brain injury (MTBI)
2. Use of age-appropriate risk assessment
3. Initial neurological examination conducted according to Advanced Trauma Life Support (ATLS) and Advanced Pediatric Life Support (APLS) guidelines
4. Home discharge based on risk assessment
5. Provision of head injury warning instructions to parents of discharged children under 6 years of age
6. Hospitalization based on outcome of risk assessment
7. Repeat CT as appropriate
8. Complete neurological examination after admission
9. Frequency of repeat neurological examinations
10. Timing of follow-up after discharge

Major Outcomes Considered

- Sensitivity, specificity, and negative predictive value of computed tomography (CT) for detecting mild traumatic brain injury (MTBI)
- Sensitivity and specificity of clinical decision rules for use of CT
- Rates of CT abnormalities
- Rates of adverse outcomes from MTBI (e.g., mortality, need for neurosurgical intervention, and rates of clinically significant brain injury)

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

A systematic search of the English literature in the MEDLINE, EMBASE, Cochrane database (2001–2009) using the key words minor head injury, mild head injury, mild traumatic brain injury, traumatic brain injury, guidelines, and management. Additional articles were identified from the bibliographies of the articles retrieved, and from textbooks. Articles were included if they contained data on classification system used (i.e., admission Glasgow Coma Scale [GCS] 13–15) and outcome data (computed tomography [CT] abnormalities, need for neurosurgical intervention, mortality) or management. Articles judged to be of historical value and existing (new) guidelines were also included and reviewed for useful data.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Evidence Classification Scheme for a Diagnostic Measure

Class I: A prospective study in a broad spectrum of persons with the suspected condition, using a 'gold standard' for case definition, where the test is applied in a blinded evaluation, and enabling the assessment of appropriate tests of diagnostic accuracy.

Class II: A prospective study of a narrow spectrum of persons with the suspected condition, or a well-designed retrospective study of a broad spectrum of persons with an established condition (by 'gold standard') compared to a broad spectrum of controls, where test is applied in a blinded evaluation, and enabling the assessment of appropriate tests of diagnostic accuracy.

Class III: Evidence provided by a retrospective study where either persons with the established condition or controls are of a narrow spectrum, and where test is applied in a blinded evaluation.

Class IV: Any design where test is not applied in blinded evaluation OR evidence provided by expert opinion alone or in descriptive case series (without controls).

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review

Description of the Methods Used to Analyze the Evidence

Where appropriate, a classification of evidence level was given for interventions and diagnostic tests (see the "Rating Scheme for the Strength of the Evidence" field).

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Where appropriate, grades of recommendation were given for management according to the neurological management guidelines of the European Federation of Neurological Societies (EFNS). Where there was a lack of evidence but consensus was clear the Task Force has stated their opinion as Good Practice Points (GPP) (see the "Rating Scheme for the Strength of Recommendations" field).

Rating Scheme for the Strength of the Recommendations

Rating of Recommendations for a Diagnostic Measure

Level A rating (established as useful/predictive or not useful/predictive) requires at least one convincing class I study or at least two consistent, convincing class II studies.

Level B rating (established as probably useful/predictive or not useful/predictive) requires at least one convincing class II study or overwhelming class III evidence.

Level C rating (established as possibly useful/predictive or not useful/predictive) requires at least two convincing class III studies.

Good Practice Point (GPP) Where there was a lack of evidence but consensus was clear the Task Force has stated its opinion as Good Practice Points.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Peer Review

Description of Method of Guideline Validation

The guidelines were validated according to the European Federation of Neurological Societies (EFNS) criteria (see the "Availability of Companion Documents" field).

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate diagnosis, evaluation, and management of mild traumatic brain injury

Potential Harms

There is a lifetime cancer mortality risk attributable to radiation to children from computed tomography.

Qualifying Statements

Qualifying Statements

This guideline provides the view of an expert task force appointed by the Scientific Committee of the European Federation of Neurological Societies (EFNS). It represents a peer-reviewed statement of minimum desirable standards for the guidance of practice based on the best available evidence. It is not intended to have legally binding implications in individual cases.

Implementation of the Guideline

Description of Implementation Strategy

The European Federation of Neurological Societies has a mailing list and all guideline papers go to national societies, national ministries of health, World Health Organisation, European Union, and a number of other destinations. Corporate support is recruited to buy large numbers of reprints of the guideline papers and permission is given to sponsoring companies to distribute the guideline papers from their commercial channels, provided there is no advertising attached.

Implementation Tools

Clinical Algorithm

Staff Training/Competency Material

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Safety

Timeliness

Identifying Information and Availability

Bibliographic Source(s)

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Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2012 Feb

Guideline Developer(s)

European Academy of Neurology - Medical Specialty Society

Source(s) of Funding

European Federation of Neurological Societies

Guideline Committee

European Federation of Neurological Societies Task Force on Mild Traumatic Brain Injury

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Financial Disclosures/Conflicts of Interest

The authors have reported no conflict of interest relevant to this manuscript.

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: Available to registered users from the [European Federation of Neurological Societies Web site](#) .

Availability of Companion Documents

The following are available:

- Brainin M, Barnes M, Baron JC, Gilhus NE, Hughes R, Selmaj K, Waldemar G; Guideline Standards Subcommittee of the EFNS Scientific Committee. Guidance for the preparation of neurological management guidelines by EFNS scientific task forces – revised recommendations 2004. *Eur J Neurol*. 2004 Sep;11(9):577-81. Electronic copies: Available in Portable Document Format (PDF) from the [European Federation of Neurological Societies \(EFNS\) Web site](#) .
- Continuing Medical Education questions are available to registered users from the [EFNS Web site](#) .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on November 20, 2012. The information was verified by the guideline developer on February 12, 2013.

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